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## Testimony

Before the Subcommittee on Science, Technology, and  
Space, Committee on Commerce, Science, and  
Transportation, U.S. Senate

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# SPACE STATION

## Cost Control Problems Continue to Worsen

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Chairman and Members of the Subcommittee:

We are pleased to be here today to discuss our current work on the International Space Station program. Earlier this year, Senator Bumpers and Representative Dingell asked us to update information we reported in July 1996 on the status of the program's financial reserves and the prime contract's cost and schedule variances and estimates at completion.<sup>1</sup> They also asked that we identify the National Aeronautics and Space Administration's (NASA) actions to maintain the program within its funding limitation.<sup>2</sup> Our testimony today is based on our work on this request.

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## Summary

In our report and subsequent testimony before this Subcommittee last year,<sup>3</sup> we pointed out the deterioration in the prime contractor's cost and schedule performance and noted that the station's near-term funding included only limited financial reserves.<sup>4</sup> We also identified what was, at that time, an emerging risk to the program: the indications of problems in the Russian government's ability to meet its commitment to furnish a Service Module providing power, control, and habitation capability for the International Space Station. We concluded that, if program costs continued to increase, threats to financial reserves worsened, and the Russian government failed to meet its commitment in a timely manner, NASA would either have to exceed its funding limitation to cope with the increased costs or defer or rephase activities, which could delay the space station's schedule and would likely increase its overall cost.

Since our report and testimony last year, the risks to the space station's cost and schedule have in fact increased. The Russian government has not been able to meet its financial responsibilities to the International Space Station, resulting in a currently projected 8-month delay in launching the Service Module. Cost control problems under the station prime contract have also steadily worsened. Since April 1996, the cost overrun has more than tripled to \$291 million and the estimated cost to get the contract back on schedule has increased by almost 50 percent to \$129 million.

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<sup>1</sup>Space Station: Cost Control Difficulties Continue (GAO/NSIAD-96-135, July 17, 1996).

<sup>2</sup>The limitation is NASA's self-imposed ceiling not to exceed \$2.1 billion annually for the Space Station and \$17.4 billion through the completion of its assembly.

<sup>3</sup>Space Station: Cost Control Difficulties Continue (GAO/T-NSIAD-96-210, July 24, 1996).

<sup>4</sup>Financial reserves are used to fund unexpected contingencies, such as cost growth, schedule delays, or changes in project objectives or scope.

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The station's financial reserves have also deteriorated significantly. NASA has taken several steps to avoid exceeding its annual and assembly completion funding limitation and to replenish its financial reserves. Such efforts have included transferring work to others, rephasing or deferring work, redefining the "assembly completion" milestone, and keeping additional funding outside the capped portion of the program.

In addition to the adverse cost and schedule impacts of the Service Module delay recently announced by NASA, considerable further cost and schedule problems could occur if the Russian government continues to be unable to fulfill its partnership commitment to the International Space Station. If further problems do materialize, we believe a congressional review of the entire program would be needed. Such a review should focus on obtaining congressional and administration agreement on the future scope and cost level for a station program that merits continued U.S. government support.

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## Russian Performance Problems

In 1993, NASA and its international partners agreed to significant changes in the space station to bring the Russian government into the program as a full partner. NASA claimed that Russian participation would enable the cost of the station, through completion of assembly, to be \$17.4 billion—a \$2 billion savings from the projected \$19.4 billion cost of the existing design at that time. Of the expected savings, \$1.6 billion was to be achieved by completing the station's assembly 15 months earlier than planned—by June 2002 instead of late 2003. We reported in 1994 that Russian participation in the program did not result in \$2 billion in savings and that NASA would have to find other savings to accelerate assembly completion by the 15 months and reduce the station's cost by the \$2 billion that was to have resulted from the Russian's participation.<sup>5</sup>

Because of the recently recognized problem with the Russian government's ability to provide the Service Module on schedule, NASA has begun to implement a three step recovery plan. Step 1, which is now underway, focuses on adjusting the station schedule for an 8-month delay in the availability of the Service Module and developing temporary essential capabilities for the station in case the Service Module is further delayed by up to 1 year. Major step 1 activities include delaying the launch of station components that are to precede the Service Module into orbit and building a stand-by temporary replacement for the Service Module's

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<sup>5</sup>Space Station: Update on the Impact of the Expanded Russian Role (GAO/NSIAD-94-248, July 29, 1994). Also, see Space Station: Impact of the Expanded Russian Role on Funding and Research (GAO/NSIAD-94-220, June 21, 1994).

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propulsion capability. The cost of step 1 activities through fiscal year 1998 is estimated at \$250 million to \$300 million.

Step 2 is NASA's contingency plan for dealing with more delay or the Russian government's failure to deliver the Service Module. Step 2 could result in permanently replacing the Service Module's power, control, and habitation capabilities. NASA's initial cost estimate for step 2 is \$750 million. Under step 3, the United States and its other international partners would have to pick up all or most of the financial and operational responsibilities the Russian government would have had, such as station resupply missions. The cost of step 3 has not been estimated.

In addition to directly affecting space station development activities, the recovery plan places additional requirements on the space shuttle program. However, the full impact of the recovery plan on the space shuttle program is not yet known.

The space station program's overall costs will likely increase by billions of dollars if the full recovery plan is implemented. NASA's decision on the need to begin step 2 is currently scheduled for later this year. This time frame will not allow the impact of NASA's recovery plan to be fully understood before the Congress finishes its deliberations on NASA's fiscal year 1998 budget. If NASA decides to initiate step 2, we believe a thorough congressional review of the total program would be warranted. Such a review should focus on evaluating the scope and cost of the station program that the Congress and the administration can agree upon in light of current circumstances. To support such a review, NASA should provide its best estimates of the additional resources required to execute its recovery plan.

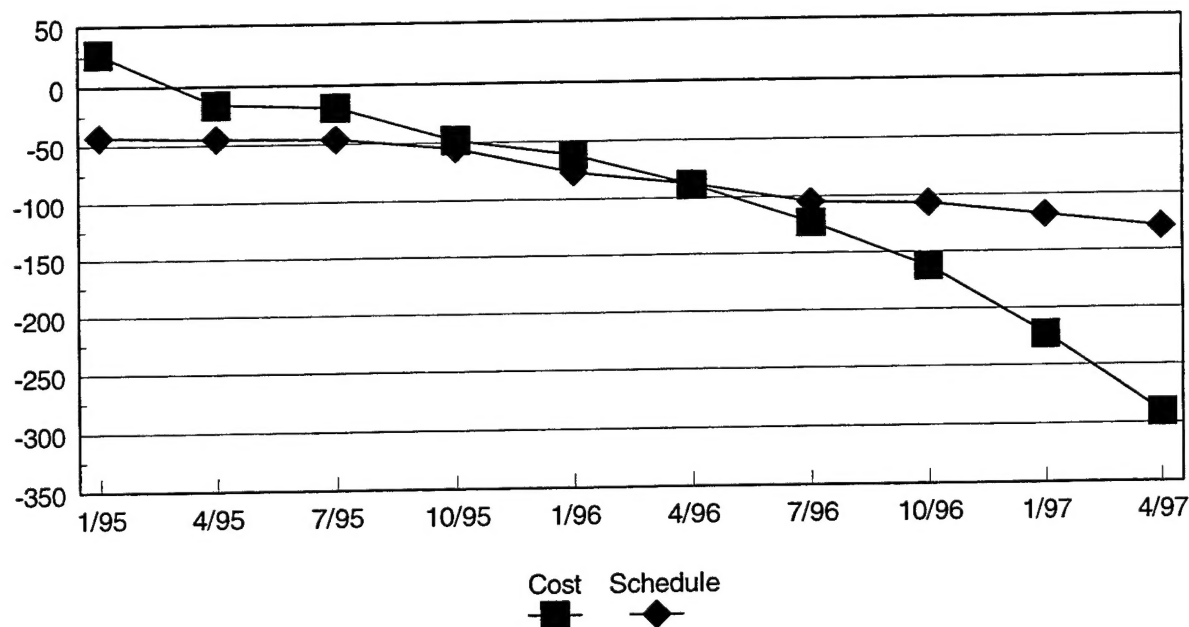
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## Worsening Cost and Schedule Performance

NASA recently told the Congress that the performance of the space station's prime contractor had not improved as much as planned. In fact, the station prime contractor's cost and schedule performance, which showed signs of deterioration last year, has continued to decline virtually unabated. The prime contract's cost and schedule variances have steadily worsened since April 1996, with the cost overrun more than tripling and the schedule

slippage increasing by almost 50 percent. Figure 1 shows the cost and schedule variances from January 1995 to April 1997.<sup>6</sup>

**Figure 1: Cost and Schedule Variances on the Space Station Prime Contract From January 1995 to April 1997**  
(Dollars in Millions)



Note: The zero line represents meeting planned cost and schedule.

Between January 1995 and April 1997, the schedule slippage increased from a value of \$43 million to \$129 million—the estimated amount that it would cost to do the work required to get the contract back on schedule. During that same period, the prime contract moved from a cost underrun

<sup>6</sup>Cost variances are the difference between actual costs to complete specific work and the amounts budgeted for that work. Schedule variances are the dollar value of the difference between the budgeted cost of work planned and work completed. Cost and schedule variances are not additive but negative schedule variances can become cost variances as additional work in the form of overtime is often required to regain schedule.

of \$27 million to a cost overrun of \$291 million. So far, the prime contractor has not been able to moderate or reverse the continued decline. Unless the deteriorating cost trend is moderated, overall cost growth at the completion of the prime contract may end up substantially higher than the cost growth currently factored into the station's budget.

## Dwindling Financial Reserves

To fund cost overruns and other requirements, NASA has been using the space station program's financial reserves at a substantial rate. Over the last 16 months, the program's financial reserves have decreased significantly—from almost \$3 billion to under \$2.2 billion. NASA estimates that its total remaining reserves by the end of fiscal 1997 will be reduced further to just over \$1.4 billion, with almost \$500 million in estimated future reserve uses (threats) listed against that balance.<sup>7</sup> Table 1 summarizes NASA's current estimate of its fiscal year 1997 reserves and threats to them.

**Table 1: Space Station Financial Reserves and Threats to Reserves for Fiscal Year 1997**

Dollars in millions	
	Amount
FY 1997 reserve level identified in FY 1998 budget request	\$180
Minus: approved and anticipated uses of reserves in FY 1997	(319)
Plus: estimated value of actual and planned reductions in FY 1997 funding requirements	150
Equals: net estimated FY 1997 reserves at the end of FY 1997	12
Minus: estimated FY 1997 impact of currently recognized threats to reserves	(19)
Equals: estimated value of required additions to FY 1997 financial reserves if the recognized threats materialize	(7)

Note: Table does not add due to rounding.

NASA uses actual and planned reductions in its fiscal year funding requirements to help restore and preserve its financial reserves. Typically, these actions involve the rephasing or deferral of activities from the current year to future years. For example, the \$150 million figure in table 1 includes moving \$20 million in spares procurement from fiscal year 1997 to 1999, and \$26 million in effort under the nonprime portion of the

<sup>7</sup>We do not yet have cost estimates for all the potential uses, restorations, and threats to financial reserves identified by NASA.

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program from fiscal year 1997 to future years.<sup>8</sup> If the restoration actions are unsuccessful and the anticipated threats occur at their estimated values, NASA will need additional funding in fiscal year 1997, unless it can reduce or offset its use of reserves in other ways.

Since 1993, NASA has consistently reported compliance with its self-imposed funding limitation for the space station of \$2.1 billion annually and \$17.4 billion through the completion of assembly. NASA has taken or planned some major actions to help it remain within the program's funding limitation and to replenish and preserve its financial reserves. For example:

- NASA dropped the station's centrifuge from the station budget and is negotiating with the Japanese government to provide it.<sup>9</sup> Along with this change, the space station's content at the "assembly complete" milestone was revised to exclude the centrifuge. This change enabled NASA to maintain the previous June 2002 assembly completion milestone, even though the centrifuge and related equipment would not be put on the station until after that date.
- NASA moved \$462 million from the station science budgets to the station development budgets for fiscal years 1996 to 1998. NASA officials told us that further review of the science portion of the station's budgets indicated that estimated funding did not match station requirements in those years. They said that these funds will be paid back in accordance with the science program's needs. NASA is currently scheduling the payback of \$350 million through fiscal year 2002.
- NASA is attempting to transfer U.S. development costs to other parties. The station program office is negotiating with its foreign partners and another potential foreign participant to build hardware for the United States in return for free or reduced-cost access to and use of the station, or other consideration. NASA has estimated that \$116 million in U.S. station development costs could be covered by these offset arrangements. Some of the negotiations are further along than others, but none are completed. Recently, NASA recorded a threat to its future years' financial reserves totaling \$100 million, based on an assumption that it may not be able to successfully negotiate most of these offsets.

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<sup>8</sup>The nonprime part of the space station program involves a large number of relatively small contracts for developing the ground-based and on-orbit capability to use and operate the space station.

<sup>9</sup>The centrifuge is a crucial piece of research equipment for the space station. NASA recently recorded a threat against future years' reserves based on being unsuccessful in these negotiations. We do not yet have information on the value of that threat.

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In addition, NASA recently requested permission to provide \$200 million more in fiscal year 1997 funding to the station from other NASA accounts and to reallocate \$100 million of its fiscal year 1998 funding request to the station program.<sup>10</sup> These amounts are intended to fund the first phase of NASA's recovery plan. NASA intends to account for these funds in a budget line outside the capped portion of the station program.

Space station costs have been increasing substantially and are likely to continue doing so. If some of these increased costs are just placed on another set of "books" and the content of the space station at "assembly complete" can be revised, we question the value of any continued reliance on the current funding limitation as a cost control mechanism.

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Mr. Chairman, this concludes our statement. We would be happy to answer any questions that you or the members of the Subcommittee may have.

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<sup>10</sup>The House and Senate Appropriations Committees recently approved the fiscal year 1997 funds. NASA has not yet determined the exact amount and source of the fiscal year 1998 funds.

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